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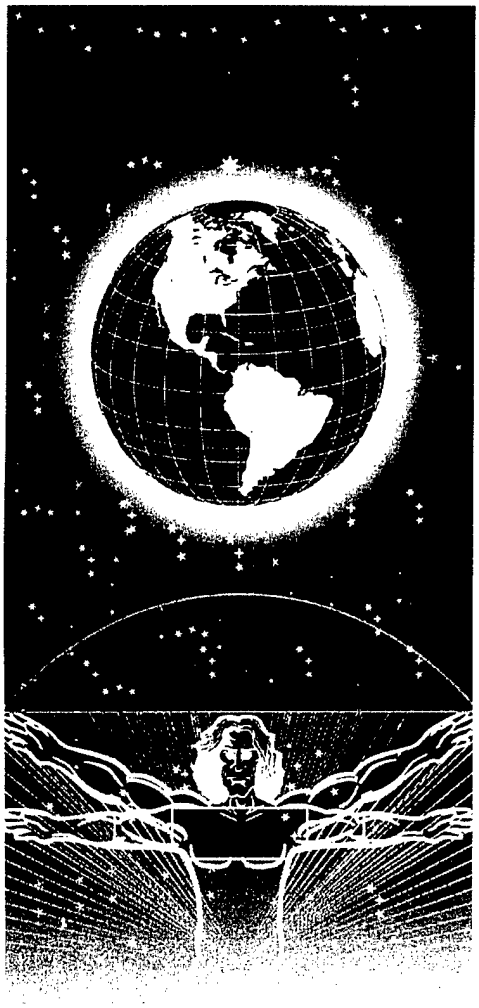

UNITED STATES AIR FORCE
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C-17 Confined Space Technical Guidance Document

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August 2002

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The following information and instructions apply to permit-required and nonpermit-required confined spaces associated with the C-17 aircraft. The majority of activities conducted within these spaces are for inspections and routine scheduled maintenance only. Flightline, depot, and other related activities are not referenced in this document. The information presented for each space type is based on the dimensions, inner characteristics, and interviews with shop personnel. Personnel performing aircraft maintenance and support are extensively trained in safe work practices, and work is conducted in accordance with (IAW) strict Technical Order (TO) and Operating Instruction (OI) directives. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of an aircraft.

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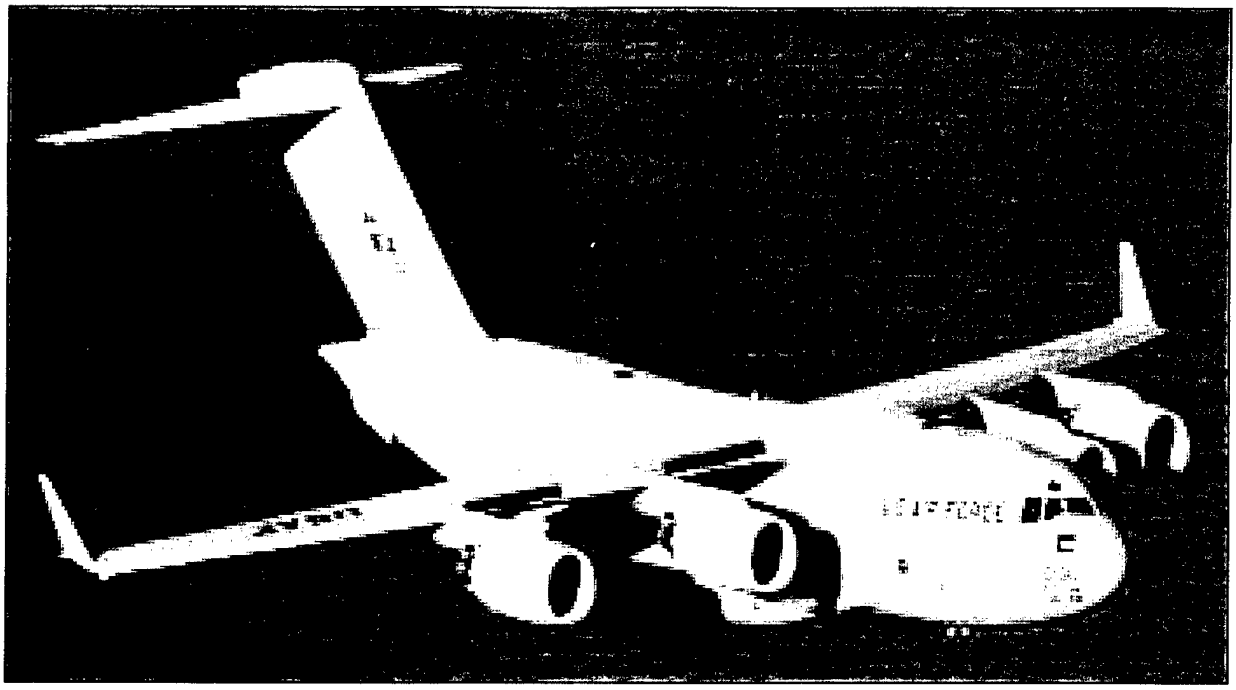


Figure 1. C-17 Globemaster III

INTRODUCTION

The Confined Space Technical Guidance Document is not a standardized compliance document. For specific compliance procedures, refer to AFOSH Standard 91-25, *Confined Spaces*; OSHA Standard 29 CFR 1910.146, *Permit-Required Confined Spaces*; and all other applicable AFOSH Standards, Technical Orders (TOs), and Operating Instructions (OIs). The following information and instructions apply to permit-required and nonpermit-required confined spaces associated with the C-17 aircraft.

The majority of activities conducted within these spaces are for inspections and routine scheduled maintenance only. Flightline, depot, and other related activities are not referenced in this document. The information presented for each space type is based on the dimensions, inner characteristics, and interviews with shop personnel. Personnel performing aircraft maintenance and support are extensively trained in safe work practices, and work is conducted in accordance with (IAW) strict TO and OI directives. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of an aircraft. The following table, *C-17 Space Classification*, lists the classification of each space assessed on the C-17.

TABLE 1. C-17 Space Classification

C-17 Space Classification		
Space Type	**Classification**	**Page Number**
Integral Fuel Tanks [Left/Right]: • Forward (Main), Reservoir, Feed Box - #2/#3 • Aft - #2/#3 • Inboard - #1/#4 • Outboard - #1/#4 • Reservoir - #1/#4	CP	4 9 11 13 14 15
• Feed Box • Vent Box	NC	16 17
Center Dry Bay Area [Left/Right]: • Forward Dry Bay • Aft Dry Bay	CS	 18 20
Underbelly (Under Floor) Maintenance Tunnel (UMT)	CP	22
Cargo Ramp (Assembly) Maintenance Tunnel – [hydraulically operated and electrically activated.]	CS	27
Aft Main Landing Gear Pods [Left/Right]	CS	29
Forward Main Landing Gear Pods [Left/Right]	NC	32
Vertical Stabilizer (T-Tail)	CS	35
Horizontal Stabilizer	CS	38
Wheel well Area – Uplock Assembly Area of Wheel well [1]	NC	41
Ram Air Turbine (RAT) Compartment	NC	44
Fuselage & Wing Area (Wing Root Area)	NC	46

NOTE: CS = Confined Space, CP = Permit-Required Confined Space, NC = Not a Confined Space.

[1] The entire wheel well area is classified as one space type. This space may be listed as two separate spaces (the wheel well area and the uplock assembly area of the wheel well).

CLASSIFICATION CRITERIA

A space is classified as a "confined space" when it meets the criteria established by AFOSH Standard 91-25, *Confined Spaces*, and OSHA Standard 29 CFR 1910.146, *Permit-Required Confined Spaces*. ALL of the following criteria must be met in order to classified a space as a confined space:

- the space is large enough to bodily enter and perform work, and
- the space has a limited means of entry and egress, and
- the space is not designed for continuous employee occupancy.

For each confined space, only one of the following criteria must be met in order to classify a confined space as permit-required:

- contains or has the potential to contain a hazardous atmosphere, or
- contains a material that has the potential for engulfing the entrant, or
- has an internal configuration such that an entrant could be trapped or asphyxiated, or
- contains any other recognized serious safety or health hazards.

RECOMMENDED ATMOSPHERIC MONITORING

I It is considered a good working practice to test the atmosphere in all confined spaces, both "permit required" and "non-permit required", prior to entry. The person designated to conduct atmospheric tests of confined spaces must be trained in operation, calibration, and maintenance of the testing equipment to include field calibration prior to each use. This may involve zero calibrating the instrument in clean air and using span gases for point calibrations. The atmospheric testing equipment must have a current calibration performed by the Test Measurement Diagnostic Equipment (TDME) lab or the manufacturer. The following atmospheric air monitoring must be conducted prior to permit-required confined space entries:

- **Oxygen (O_2):** The concentration of oxygen in the confined space must be greater than or equal to 19.5 percent and less than or equal to 23.5 percent.

- **Flammability:** The concentration of flammable or combustible vapors, gas, or mist in the confined space must be less than or equal to 10 percent of the Lower Explosive Limit (LEL).

- **Toxic Materials:** Atmospheric concentration of any chemical substance must be below that level which may cause death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects.

During normal operations, entries must not be conducted when immediately dangerous to life and health (IDLH) conditions exist. Exceptions to this rule are found in AFOSH Standard 91-25, *Confined Spaces*, paragraph 4.3.

C-17 GLOBEMASTER III

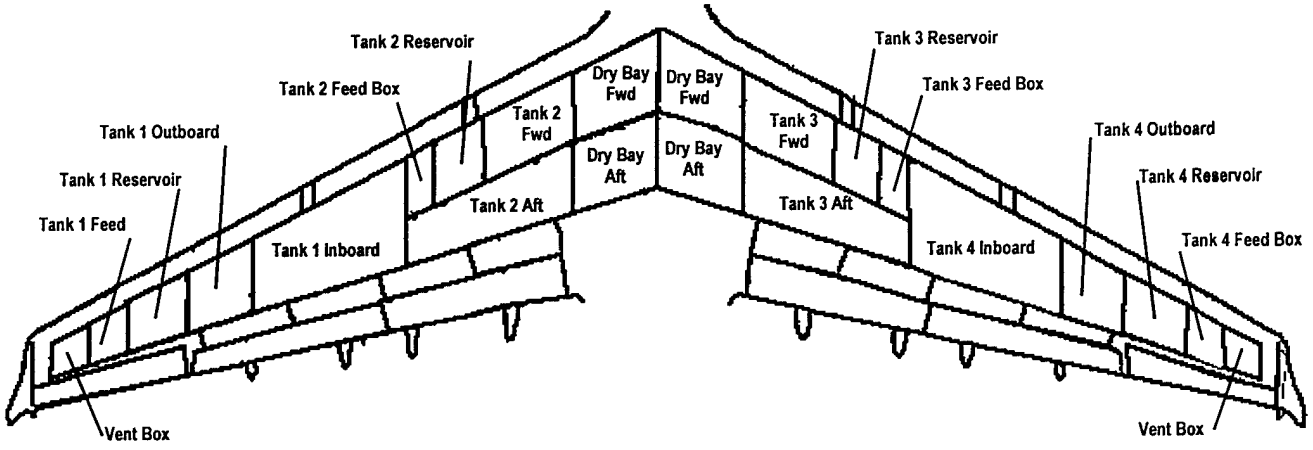
INTEGRAL FUEL TANKS – GENERAL CONDITIONS & REQUIRED PROCEDURES

SPACE DESCRIPTION

The C-17 aircraft contains a total of 14 (7 on each wing) integral fuel tanks. The fuel tank #2 feed box, reservoir, and forward sections are combined as a single space (the same applies to tank #3). Six of the 14 fuel tanks (vent boxes, feed boxes, reservoirs #1 & #4) are not confined spaces because they are not large enough to bodily enter. Integral fuel tanks were developed because they offer the capacity of greater fuel containment with a decrease in weight over a fuel cell type construction. The integral fuel tanks are designed with seal planes instead of fuel bladders (like the fuel cells) for retaining the fuel. Seal planes provide airtight dividers between the dry bays and surrounding sides of the fuel tanks. They are sealed with gaskets, structural adhesives, elastic films or other sealants. The C-17 fuel tanks contain fuel lines, fuel valves, and fuel pumps.

Confined space entries into the integral fuel tanks and fuel cells are performed IAW TO 1-1-3, *Inspection and Repair of Aircraft Integral Tanks and Fuel Cells, 30 November 1994*. The TO includes the following information regarding fuel tanks and fuel cell:

- Entering fuel tanks that have been depuddled, purged, docked, and grounded.
- Identifies specific repair/rework procedures, equipment, and chemicals which are authorized for use during entries into integral fuel tanks.
- Outlines specific safety procedures such as ventilation, personal protective equipment, emergency equipment, etc.



TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the integral fuel tanks to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, Isochronal (ISO) Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following lists scheduled routine maintenance conducted predominantly by the Fuel Systems shop:

- The sealant is removed and replaced ten times a year per aircraft. The entire time spent in the space is approximately six hours. Chemicals used or are present within the space are JP-8, Methyl-Ethyl-Ketone (MEK), sealant, petrolatum, and adhesion promoters. During entry, personnel wear respiratory protection, chemical resistant gloves, coveralls, goggles or safety glasses, and hearing protection. This procedure is performed IAW TOs *1-1-3,* and *1C-17A-2-28JG-00-1.*

- Internally mounted components, such as probes, are removed and replaced five times a week for each aircraft. Each probe takes approximately one hour to remove and replace. Chemicals used or are present within the space are JP8, MEK, sealant, petrolatum, and adhesion promoters. During entry, personnel wear respiratory protection, chemical resistant gloves, coveralls, goggles or safety glasses, and hearing protection. This procedure is performed IAW TOs *1-1-3,* and *1C-17A-2-28JG-00-1.*

- Internal tank repairs are conducted ten times per year. The entire time spent in the space is approximately six hours. Chemicals used or are present within the space are JP8, MEK, sealant, and adhesion promoters. During entry, personnel wear respiratory protection, chemical resistant gloves, coveralls, safety goggles, and hearing protection. This procedure is performed IAW TOs *1-1-3*, *1C-17A-3*, and *1C-17A-2-28JG-00-1.*

Only authorized materials, or materials which have been fully evaluated and approved by Installation Ground Safety (SEG), Installation Fire Department (CEF), and Bioenvironmental Engineering (BE) offices can be used within the integral fuel tanks. Hot work, such as grinding, welding or brazing in a permit-required confined space requires a confined space entry permit AND a hot work permit. Both permits must be reviewed and approved in writing by SEG, CEF, and BE prior to conducting any hot work in the space.

POTENTIAL HAZARDS

The following table, *Potential Hazards*, contains various hazards that could be encountered when performing a permit-required confined space entry into the fuel tanks. The systems described in the table (e.g., fuel valves, fuel pumps, fuel conduit) are closed/contained, and are hazardous if they are intentionally opened or a leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of aircraft.

TABLE 2. Potential Hazards (Integral Tanks- General)

POTENTIAL HAZARDS	
Hazard	**Hazard Description**
Combustibility	The fuel tanks have the potential to contain jet fuel and/or jet fuel vapors that are combustible.
Entrapment	The integral fuel tanks are extremely confined areas that contain several structural braces and fuel lines/pumps/valves throughout the space. This creates an entrapment hazard for entry personnel due to limited maneuverability and delayed egress.
Hazardous Materials Present	Jet fuel and/or fuel vapors may be present in various cavities of the space. Jet fuel and its constituents (e.g., benzene, toluene, xylene) can be a potential hazard to the entrant by route of inhalation, skin absorption, ingestion, and contact.
Introduction of Hazardous Materials	The solvents and cleaners used for cleaning, and adhesives used for sealing the tanks, could potentially include hazardous materials. Only authorized chemicals should be used within the integral fuel tanks and fuel cells.
Oxygen Deficiency	Oxygen deficiency caused by oxygen displacement is a potential hazard due to unfavorable ventilation and fuel vapors. In addition, several operations require the use of solvents, cleaners, and/or adhesives. Depending on the quantity and duration of use, the constituents of the chemicals could displace the oxygen within the space.
Temperature Extremes	Temperature extremes may present a hazard due to one or a combination of several factors such as ambient temperature, radiant heat, local winds, support equipment, and PPE.
Unfavorable Natural Ventilation	Due to the small entry access, there is normally minimal natural ventilation within the space.

RECOMMENDED ENGINEERING/ADMINISTRATIVE CONTROLS

The following engineering and administrative controls should be in place prior to making permit-required confined space entries into fuel tanks:

- **Depuddling:** Fuel tanks will be defueled, drained, depuddled, and purged to the extent necessary to perform the required tasks.

- **Electrical:** Except for specific depot exclusions, the aircraft electrical system shall be deenergized and locked and tagged out prior to opening integral fuel tanks. The aircraft should also be grounded and bonded prior to entry.

- **Lockout/Tagout:** Lockout/tagout procedures must be performed on electrical and mechanical systems prior to entry. Danger tags are placed on the relevant circuit breakers, batteries, and external power. Restricted areas are established to minimize foot traffic.

- **Ventilation:** Fuel tanks shall be ventilated for 30 minutes prior to space occupancy and continuously thereafter. Ventilation must be used as necessary to ensure safe atmospheric conditions during entry.

- **Administrative:** Personnel should minimize the time spent in confined spaces by performing only necessary tasks within the space. Any work that can be conducted outside of the space should not be performed during the entry.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE must be assigned based on the atmospheric conditions of the confined space, the physical hazards present, the task being performed, and the hazardous materials being used. Protective equipment that may be used for tasks in this space include:

- respiratory protection,
- non-absorbent coveralls,
- approved footwear,
- disposable nitrile or neoprene gloves,
- cap or head covering,
- goggles or safety glasses with side shields, and
- neoprene rubber knee pads, elbow pads, or mats.

RECOMMENDED EMERGENCY EQUIPMENT

The following emergency equipment is recommended to be present in the Fuels or Flightline Maintenance area and verified to be in working condition by the designated entry authority prior to authorizing confined space entries:

- intrinsically safe hand radio,

- 150 pound halon fire extinguisher,

- intrinsically safe flashlights, lamps, or lanterns rated for class I, division 1 hazardous atmospheres,

- additional respiratory protection as recommended by BE, and
- rescue webbing harness.

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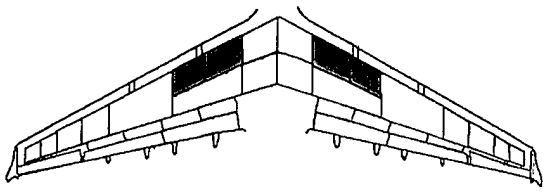
INTEGRAL FUEL TANKS (2, 3) – FORWARD (MAIN), RESERVOIR, & FEED BOX



SPACE DESCRIPTION

There is a single forward (main) integral fuel tank on each wing of the C-17 aircraft (two tanks total) that can be entered completely by maintenance personnel. Each forward fuel tank (2, 3) is connected to a fuel reservoir and fuel feed box by port-hole baffles. The forward fuel tanks are located next to the outboard side of the forward dry bays. Each tank contains fuel valves, fuel pumps, fuel lines, and port-hole baffles.

INNER DIMENSIONS

Entire Forward Fuel Tank:	Length = 24.5'	Width = 8.5'	Depth = 3.5' to 4'
1. Main Fuel Tank Area:	Length = 14.0'	Width = 8.5'	Depth = 3.5' to 4'
2. Reservoir Area:	Length = 6.5'	Width = 4.5'	Depth = 3.5'
3. Feed Box Area:	Length = 4.25'	Width = 4.5'	Depth = 3.5'

ENTRY DIMENSIONS

Top (5): Length = 19.0" Width = 10.0"
Side (5): Length = 19.0" Width = 15.0"
(all ten entrances are oval)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each forward fuel tank area has three compartments: the main fuel tank, a fuel reservoir, and a fuel feed box. The three compartments are connected by port-hole baffles. The main fuel tank area has two entrances on top of the wing, and two side openings (port-hole baffles) along the rear wall separating the forward fuel tank and the aft fuel tank. The reservoir section has two entrances on top of the wing, and two side port-hole baffles along the rear wall separating the reservoir area with the aft fuel tank. The feed box has a single access on the wing, and a single side port-hole baffle along the wall separating the feed box and the aft fuel tank.

RECOMMENDED CLASSIFICATION

Permit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The forward fuel tank area is permit-required due to the following conditions:

- contains or has the potential to contain a hazardous atmosphere (e.g., fuel and its constituents), and
- has an internal configuration such that an entrant could be trapped or asphyxiated (e.g., support braces/ribs, limited space congested with fuel lines/pumps/valves).

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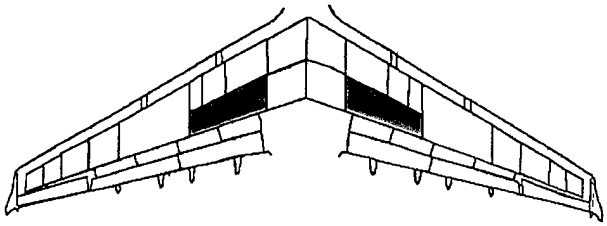
INTEGRAL FUEL TANKS – AFT (2, 3)



SPACE DESCRIPTION

There is a single aft fuel tank on each wing of the C-17 aircraft (two tanks total) that can be entered completely by maintenance personnel. These fuel tanks are located between the outboard side of the aft dry bays and the inboard side of the inboard integral fuel tank (1, 4). Each tank contains fuel valves, fuel pumps, fuel lines, and port-hole baffles.

INNER DIMENSIONS

Length = 24.5'
Width = 7.0'
Depth = 3.5' to 4.0'

ENTRY DIMENSIONS

Side (5): Length =19.0" Width = 15.0"
(all five entrances are oval)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The aft fuel tanks do not have entrances on the top or on the bottom of the wings. There are five side port-hole baffles dividing the three forward integral fuel tanks (2, 3) and the aft integral fuel tanks (2, 3). The aft fuel tanks can only be accessed through the three forward fuel tank compartments (fuel feed box, fuel reservoir, and forward main area).

RECOMMENDED CLASSIFICATION

Permit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The aft fuel tanks are permit-required due to the following conditions:

- contains or has the potential to contain a hazardous atmosphere (e.g., fuel and its constituents), and

- has an internal configuration such that an entrant could be trapped or asphyxiated (e.g., support braces/ribs, limited space congested with fuel lines/pumps/valves).

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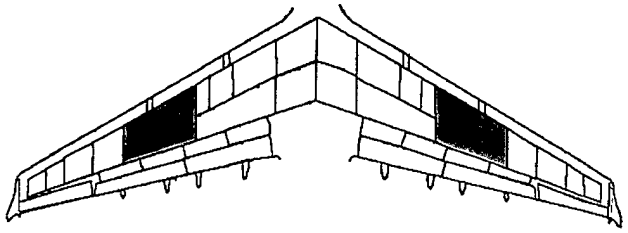
INTEGRAL FUEL TANKS – INBOARD (1, 4)



SPACE DESCRIPTION

There is a single inboard fuel tank on each wing of the C-17 aircraft (two tanks total) that can be entered completely by maintenance personnel. These fuel tanks are located between the outboard integral fuel tanks (1, 4) and the forward/aft fuel tanks (2, 3). Each tank contains fuel valves, fuel pumps, and fuel lines.

INNER DIMENSIONS

Length = 28.0'
Width = 11.0'
Depth = 3.0' to 3.5'

ENTRY DIMENSIONS

Top (5): Length = 19.0" Width = 10.0"
(all five entrances are oval)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each inboard fuel tank has five top oval entrances located on top of the wing.

RECOMMENDED CLASSIFICATION

Permit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The inboard fuel tanks are permit-required due to the following conditions:

- contains or has the potential to contain a hazardous atmosphere (e.g., fuel and its constituents), and
- has an internal configuration such that an entrant could be trapped or asphyxiated (e.g., support braces/ribs and limited space congested with fuel lines/pumps/valves).

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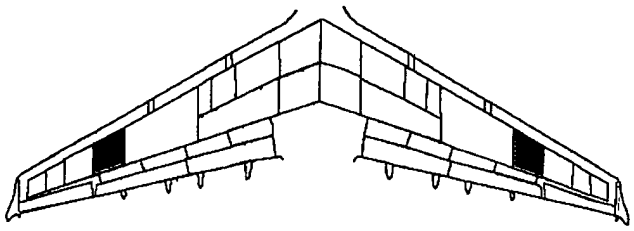
INTEGRAL FUEL TANKS – OUTBOARD (1, 4)



SPACE DESCRIPTION

There is a single outboard fuel tank on each wing of the C-17 aircraft (two tanks total) that can be entered completely by maintenance personnel. These fuel tanks are located between the inboard integral fuel tanks (1, 4) and the reservoir fuel tank (1, 4). Each tank contains fuel lines and fuel valves.

INNER DIMENSIONS

Length = 10.0'
Width = 9.0'
Depth = 2.0' to 3.0'

ENTRY DIMENSIONS

Top (2): Length = 19.0" Width = 10.0"
(both entrances are oval)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each outboard fuel tank has two top entrances located on top of the wing.

RECOMMENDED CLASSIFICATION

Permit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The outboard fuel tanks are permit-required due to the following conditions:

- contains or has the potential to contain a hazardous atmosphere (e.g., fuel and its constituents), and
- has an internal configuration such that an entrant could be trapped or asphyxiated (e.g., support braces/ribs and limited space congested with fuel lines/valves).

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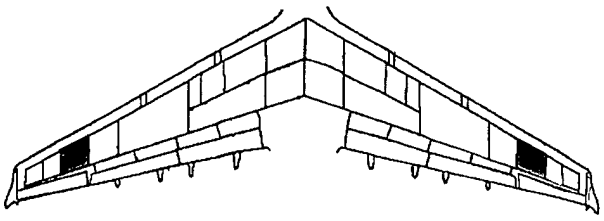
INTEGRAL FUEL TANKS – RESERVOIR (1, 4)



SPACE DESCRIPTION

There is a single reservoir fuel tank on each wing of the C-17 aircraft (two tanks total) that can be bodily entered from the waist up by maintenance personnel. These tanks are located between the outboard integral fuel tanks (1, 4) and the feed box fuel tanks (1, 4). Each tank contains fuel lines and fuel valves throughout the space.

INNER DIMENSIONS

Length = 9.0'
Width = 5.5'
Depth = 2.0'

ENTRY DIMENSIONS

Bottom (2): Length = 19.0" Width = 10.0"
Top (1): Length = 19.0" Width = 10.0"
(all three entrances are oval)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each reservoir fuel tank has three oval entrances. Two of the entrances are located on the bottom of the wing, and the third entrance is located on top of the wing.

RECOMMENDED CLASSIFICATION

Permit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The reservoir fuel tanks are permit-required due to the following conditions:

- contains or has the potential to contain a hazardous atmosphere (e.g., fuel and its constituents), and
- has an internal configuration such that an entrant could be trapped or asphyxiated (e.g., support braces/ribs and limited space congested with fuel lines/valves).

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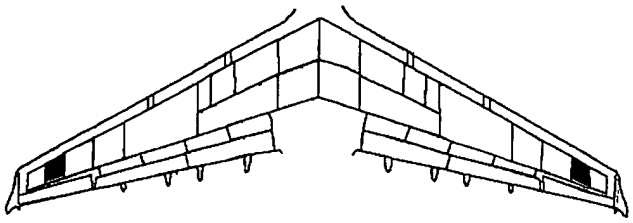
INTEGRAL FUEL TANKS – FEED BOX (1, 4)



SPACE DESCRIPTION

There is a single feed box fuel tank on each wing of the C-17 aircraft (two tanks total). These tanks are located between the fuel vent box and the reservoir fuel tank (1, 4).

INNER DIMENSIONS

Length = 4.0'
Width = 4.0'
Depth = 1.5'

ENTRY DIMENSIONS

Bottom (2) : Length = 19.0" Width = 10.0"
(both entrances are oval)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each feed box fuel tank has two oval entrances located on the bottom of the wing.

RECOMMENDED CLASSIFICATION

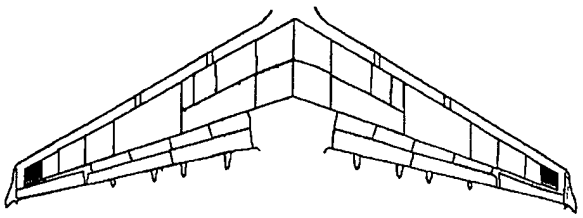
Not a confined space.

JUSTIFICATION FOR CLASSIFICATION

The feed box fuel tanks cannot be bodily entered due to the size and structural components. Therefore, they are not confined spaces and not regulated IAW the AFOSH and OSHA confined space standards.

C-17 GLOBEMASTER III

INTEGRAL FUEL TANKS – VENT BOX



SPACE DESCRIPTION

There is a single vent box fuel tank on each wing of the C-17 aircraft (two tanks total). These tanks are located next to the fuel feed box at the wing tip.

INNER DIMENSIONS

Length = 4.0'
Width = 3.5'
Depth = 1.5'

ENTRY DIMENSIONS

Bottom (2): Length = 19.0" Width = 10.0"
(both entrances are oval)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each feed box fuel tank has two oval entrances that are located on the bottom of the wing.

RECOMMENDED CLASSIFICATION

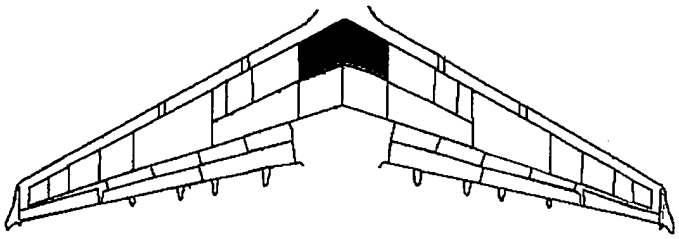
Not a confined space.

JUSTIFICATION FOR CLASSIFICATION

The vent box fuel tanks cannot be bodily entered due to the size and structural components. Therefore, they are not confined spaces and not regulated IAW the AFOSH and OSHA confined space standards.

C-17 GLOBEMASTER III

DRY BAYS – FORWARD (LEFT/RIGHT)



SPACE DESCRIPTION

There are a total of four dry bays (two on each wing) in the center of the C-17 aircraft (between the wings). The dry bays are designed with seal planes, which provide airtight dividers between the dry bays and the surrounding sides of the fuel tanks. They are sealed with gaskets, structural adhesives, elastic films, or other sealants.

There is a single forward dry bay on each wing (two forward dry bays total) that can be entered completely by maintenance personnel. These dry bays are located between the forward fuel tanks 2 and 3. The forward dry bays contain fuel lines, fuel pumps, and fuel valves throughout the space.

INNER DIMENSIONS

Length = 14.0'
Width = 8.5'
Depth = 4.0' to 4.5'

ENTRY DIMENSIONS

1. Top: Length = 19.0" Width = 10.0"
2. Side: Length = 19.0" Width = 15.0"
(both entrances are oval)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each forward dry bay has a top oval entrance on the wing. There is a side port-hole baffle separating the forward dry bay with the aft dry bay.

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., fuel pumps/lines/valves) that are not CREDIBLE potential hazards and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACES

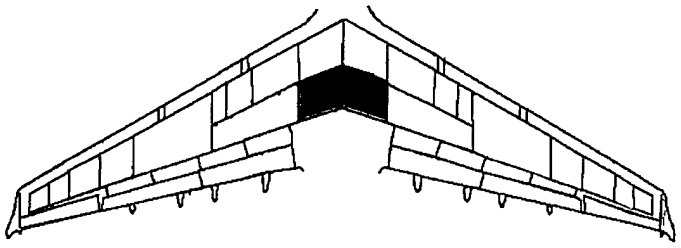
Personnel from several work centers can enter the forward dry bays to perform both general and emergency maintenance, repair, and/or replacement activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following tasks may be performed during scheduled and routine maintenance:

- Removing, closing, and/or reinstalling integral tanks from within the dry bays.
- Removal and installation of fuel systems and other related components.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the forward dry bays.

C-17 GLOBEMASTER III

DRY BAYS – AFT (LEFT/RIGHT)



SPACE DESCRIPTION

There are a total of four dry bays (two on each wing) in the center of the C-17 aircraft (between the wings). The dry bays are designed with seal planes, which provide airtight dividers between the dry bays and the surrounding sides of the fuel tanks. They are sealed with gaskets, structural adhesives, elastic films, or other sealants.

There is a single aft dry bay on each wing (two aft dry bays total) that can be entered completely by maintenance personnel. These dry bays are located between aft fuel tanks 2 and 3. The aft dry bays contain fuel lines, fuel pumps, and fuel valves throughout the space.

INNER DIMENSIONS

Length = 9.75'
Width = 8.5'
Depth = 4.0' to 4.5'

ENTRY DIMENSIONS

Length = 19.0"
Width = 15.0"
(oval entrance)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each aft dry bay has a single side port-hole baffle that separates the aft dry bay with the forward dry bay. The aft dry bay can only be entered from inside the forward dry bay.

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., fuel pumps/lines/valves) that are not CREDIBLE potential hazards, and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

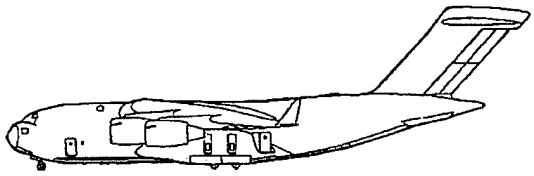
TASKS PERFORMED WITHIN THE SPACES

Personnel from several work centers can enter the aft dry bays to perform both general and emergency maintenance, repair, and/or replacement activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following tasks may be performed during scheduled and routine maintenance:

- Removing, closing, and/or reinstalling integral tanks from within the dry bays.
- Removal and installation of fuel systems and other related components.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the aft dry bays.

C-17 GLOBEMASTER III



UNDERBELLY (UNDER FLOOR) MAINTENANCE TUNNEL (UMT)

SPACE DESCRIPTION

The under-floor maintenance tunnel (UMT) is located along the underbelly of the aircraft, and can be accessed by maintenance personnel from two areas. The space contains the brake assembly control valve system, brake cables, a winch assembly, avionics components, aerial refueling system components, the auxiliary power unit (APU) feed line shroud, the dry bay drain system, and the on-board inert gas generating system (OBIGGS).

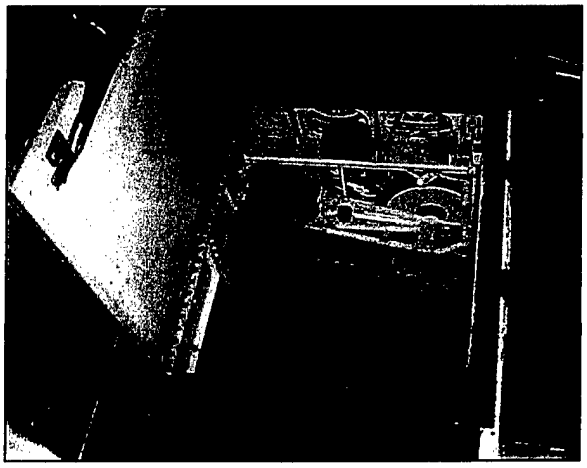


Figure 2. UMT: Forward top access located in cargo area.

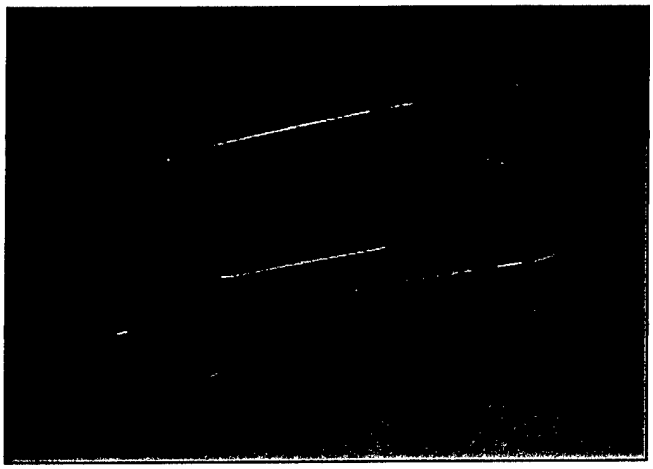


Figure 3. UMT: Aft bottom access located on belly.

INNER DIMENSIONS

Height = 17.0'
Length = 72.0'
Depth = 2.0' to 3.0'

ENTRY DIMENSIONS

1. Top: Length = 2.5' Width = 2.0'
2. Bottom: Length = 32.0" Width = 21.0"

(both entrances are rectangular)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The UMT has two entrances. The top entrance is located in the floor of the cargo area (forward end). The bottom entrance is located on the underbelly of the aircraft at the aft end. The bottom access is locked from the inside; however, in the future, the locking mechanism will be moved to the outside of the space.

RECOMMENDED CLASSIFICATION

Permit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The UMT is permit-required due to the following conditions:

- contains or has the potential to contain a hazardous atmosphere (e.g., oxygen depletion from the OBIGGS nitrogen tanks), and
- contains other recognized serious or health hazards (e.g., electrical avionics cables/sequential switches, high pressure hydraulic lines), and
- has an internal configuration such that an entrant could be trapped or asphyxiated (e.g., crossbars/braces, limited space).

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the UMT to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following tasks may be performed during scheduled and routine maintenance:

- Routine maintenance inspections are conducted on each aircraft every 120 days. Each inspection takes approximately 2 hours. Visual inspections are performed on the brake assembly control valves, brake cables, winch assembly, and the OBIGGS components. The brake and winch cables are lubed, and the brake assembly hydraulic fluid level is topped-off. The only chemicals used during the inspection are hydraulic fluid and a 12-ounce cartridge of lubricant/grease. During entry, personnel wear safety goggles, disposable nitrile or neoprene gloves, and hearing protection.

- Brake control valve servicing is conducted every 240 days. The brake control valve system contains a hydraulic fluid drain container that is removed, drained, reinstalled, and then filled with new hydraulic fluid. This procedure takes approximately 1 hour. The brake control valve system has four 23-gallon hydraulic fluid reservoirs located outside of the UMT. During entry, personnel wear safety goggles, disposable nitrile or neoprene gloves, and hearing protection.

- Avionics components are serviced by repairing or replacing the sequential switches (28-volt system). Every 120 days, one out of the six sequential switches is repaired and replaced. The damaged sequential switches are identified from the cockpit display unit (CDU) located near the flight deck of the aircraft. Removal and replacement of a sequential switch is conducted mechanically using bolts and screws. No chemicals are used during this task. During entry, personnel wear hearing protection.

- Personnel periodically enter the UMT to replace or repair the separation modules and compressors from the OBIGGS system. The OBIGGS system uses engine bleed air to produce nitrogen enriched air (NEA) used to inert the aircraft fuel tanks. Electrically driven separation modules are used to separate the oxygen from the engine bleed air to produce the NEA. The NEA is then compressed by two 4-stag compressors and stored in two nitrogen bottles in the UMT. This task is performed under TOs *1C-17A-4-47* and *1C-17A-2-12JG-47-1*.

- Occasionally, Fuels shop personnel enter the UMT to troubleshoot and perform minor repairs on the APU feed line shroud, the dry bay drain system, refueling system hydraulic pressure reducer valve, and shrouded coupling drain can. Entries for performing these tasks are conducted under TO *1C-17A-2-00JG-00-1, November 1999*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the UMT. Personnel perform entries only after draining the nitrogen tanks and after the internal ventilation system has been operating for at least ten minutes with the forward aft hatches open. Hot work, such as grinding, welding or brazing in a permit-required confined space requires a confined space entry permit AND a hot work permit. Both permits must be reviewed and approved in writing by SEG, CEF, and BE prior to conducting any hot work in the space.

POTENTIAL HAZARDS

The following table, *Potential Hazards*, contains various hazards that could be encountered when performing permit-required confined space entries into the UMT. The systems described in the table (e.g., fuel manifolds, hydraulic lines) are closed/contained, and are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that are strictly complied with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TABLE 3. Potential Hazards (Underbelly Maintenance)

POTENTIAL HAZARDS	
Hazard	**Hazard Description**
Electrical	There are electrical brake control valve assembly and avionics components throughout the space.
Entrapment	The UMT is an extremely long and confined area that contains crossbars/braces, cables, and avionics/brake components throughout the space. The combination of the extensive length, confined area, and restrictive components creates an entrapment hazard for entry personnel due to limited maneuverability and delayed egress.
Oxygen Deficiency	When the internal ventilation system of the UMT is not activated, unfavorable ventilation and the possible presence of nitrogen from ruptured tanks can displace the oxygen causing a potential oxygen deficiency.
Stored Energy	There are pressurized hydraulic lines running throughout the space.
Temperature Extremes	Temperature extremes may present a hazard due to one or a combination of factors such as ambient temperature, radiant heat, support equipment, and PPE.
Unfavorable Natural Ventilation	Due to the small entrances and the length of the tunnel, there is minimal natural ventilation within this space.

RECOMMENDED ENGINEERING/ADMINISTRATIVE CONTROLS

The following engineering and administrative controls should be in place prior to entering the UMT:

- **Ventilation:** Ventilating a confined space before entry is not necessary if atmospheric monitoring results are acceptable. Atmospheric monitoring will be performed prior to entry and continuously thereafter. However, the entry authority can and should use ventilators to maintain acceptable air quality within the space during the entry if necessary. The UMT contains a built-in ventilation system that remains on during entries.

- **Lockout/Tagout:** Lockout/tagout procedures must be performed on electrical and mechanical systems prior to entry. The UMT contains electrical cables that can cause bodily harm if mishandled. All electrical systems must be deenergized using lockout/tagout procedures as specified by OSHA Standard 1910.147, *The Control of Hazardous Energy*, and AFI 32-1064, *AFOSH Lockout/Tagout* prior to working on them.

- **Administrative:** Personnel should minimize the time spent in confined spaces by performing only necessary tasks within the space. Any work that can be conducted outside of the space should not be performed during the entry.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE must be assigned based on the atmospheric conditions of the confined space, the physical hazards present, the task being performed, and the hazardous materials being used. Protective equipment that may be used for tasks in this space include:

- coveralls,
- approved footwear,
- disposable nitrile or neoprene gloves, and
- goggles or safety glasses with side shields.

RECOMMENDED EMERGENCY EQUIPMENT

The following emergency equipment is recommended to be available and verified to be in working condition by the designated entry authority prior to authorizing confined space entries into the UMT:

- intrinsically safe hand radio,

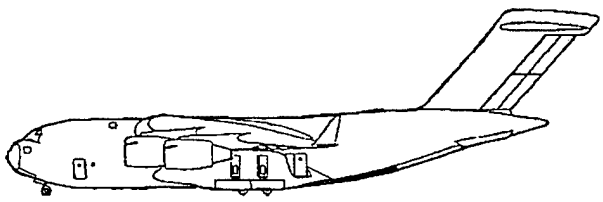
- 150 pound halon fire extinguisher,

- intrinsically safe flashlights, lamps, or lanterns rated for class I, division 1 hazardous atmospheres, and

- additional respiratory protection as recommended by BE.

C-17 GLOBEMASTER III

CARGO RAMP (ASSEMBLY) MAINTENANCE TUNNEL



SPACE DESCRIPTION

The cargo ramp tunnel is a hydraulically operated and electrically activated ramp used to transport cargo and vehicles in and out of the C-17 aircraft. The ramp is located at the aft end of the aircraft, and can be accessed by maintenance personnel. The space contains hydraulic lines/pumps, electrical wires, and several chambers separated by support braces/ribs.

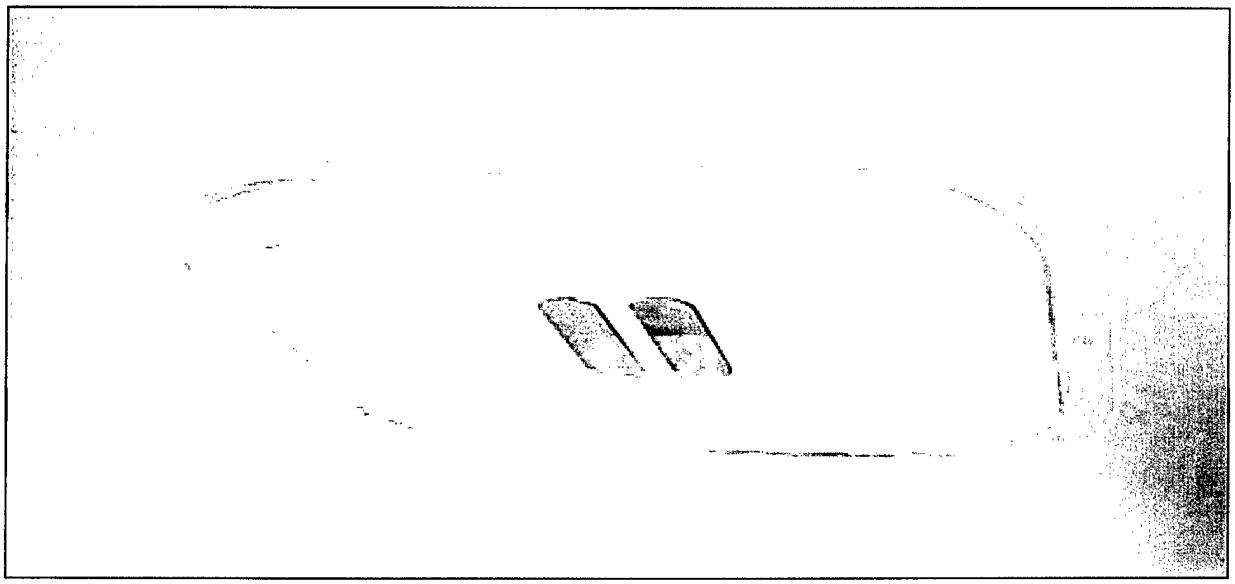


Figure 4. Cargo Ramp Tunnel: Access located on aircraft belly.

INNER DIMENSIONS

Height = 36.0'
Length = 17.0'
Depth = 2.0' to 3.0'

ENTRY DIMENSIONS

Length = 20.0"
Width = 20.0"
(square entrance)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The cargo ramp tunnel has a single bottom entrance located on the underbelly of the aircraft. It is accessed only when the ramp is down.

RECOMMENDED CLASSIFICATION

Non permit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., hydraulic pumps/lines, electrical wires) that are not CREDIBLE potential hazards, and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

Personnel rarely enter the cargo ramp tunnel. Routine scheduled maintenance is usually conducted by inserting only the worker's arms into the space. Personnel from several work centers can enter the cargo ramp tunnel to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following task may be performed during scheduled and routine maintenance:

- Structural repair on each aircraft is conducted every three years. Sheet metal and brackets are repaired or replaced using mechanical methods such as riveting (welding is not performed in the space). This procedure takes approximately three hours. Lockout/tagout is performed on the ramp hydraulic system by removing the appropriate circuit breaker from the breaker box located in the cargo area. During entry, personnel wear hearing protection and goggles or safety glasses. This task is performed IAW TO *1C-17A-2-6WC-4-SET12*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the cargo ramp tunnel.

C-17 GLOBEMASTER III

MAIN LANDING GEAR POD – AFT (LEFT/RIGHT)

Not Shown
(Located Underneath Aircraft)

SPACE DESCRIPTION

The aft main landing gear pod is located underneath the C-17 aircraft behind the rear wheel wells, and can be accessed by maintenance personnel. The space contains fuel pumps, fuel lines, hydraulic pumps/lines, and low voltage electrical cables and breakers.

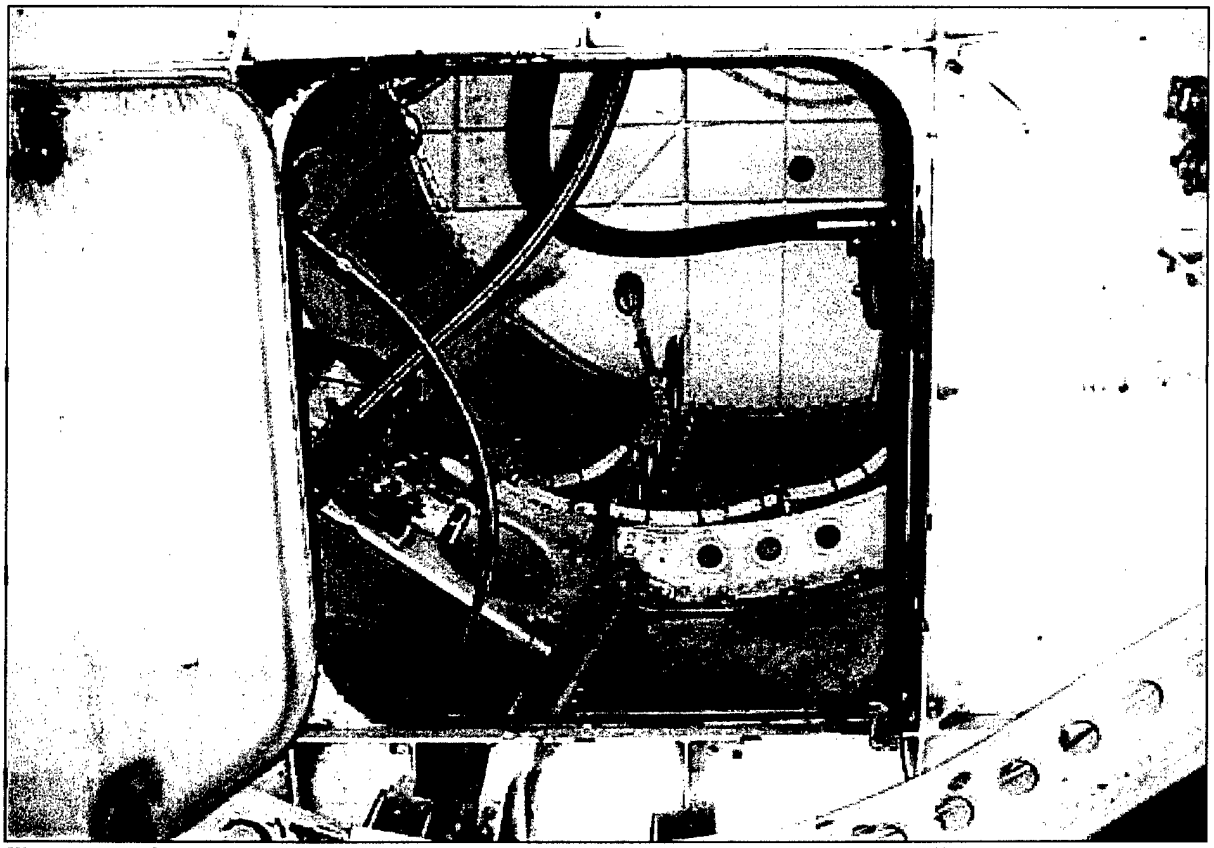


Figure 5. Aft Main Landing Gear Pod: Side entrance, behind the wheel well.

INNER DIMENSIONS

Lower Area: Diameter = 5.0' Depth = 4.0'
Upper Area: Diameter = 2.0' to 3.0' Height = 5.0'
(horizontal-cylinder inner shape)

ENTRY DIMENSIONS

Length = 2.0'
Width = 2.0'
(square entrance)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each aft landing gear pod has a single entrance that is accessed through the side of the space. The space has a smaller area above the main section where the entrance is located (lower area). This upper area is cylinder-shaped (vertically) with a 5' height and 2' to 3' diameter.

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., fuel pumps/lines, hydraulic pumps/lines, electrical cables/breakers) that are not CREDIBLE potential hazards, and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

The aft landing gear pod is rarely entered. Personnel from several work centers may enter the aft landing gear pod to perform both scheduled and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following task may be performed during scheduled and routine maintenance:

- Structural brace repair/replacement is conducted once every five years, or as needed for each aircraft. Workers may enter the space for a few minutes in order to assess the damage and measure the damaged brace. The Structural Maintenance shop may have to repair, replace, or fabricate the part to be installed. Installation of the brace requires the use of mechanical techniques such as riveting (welding is not conducted in the space). This procedure takes 30 minutes to 1 hour to complete. Approximately three alcohol wipes are used for each brace repair/replacement. A sealant may be applied around the edge of a fabricated patch depending on the location of the repair. This task is performed under TO *1C-17A-4-32*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the aft landing gear pod.

C-17 GLOBEMASTER III

MAIN LANDING GEAR POD – FORWARD (LEFT/RIGHT)

Not Shown
(Located Underneath Aircraft)

SPACE DESCRIPTION

There are two forward main landing gear pods located underneath the aircraft (left/right). The right side contains the auxiliary power unit (APU), air-conditioning ducts, a hydraulic pump, hydraulic lines, and the environmental control system (ECS) pack. The left forward main landing gear pod contains all of the above components except for the APU.

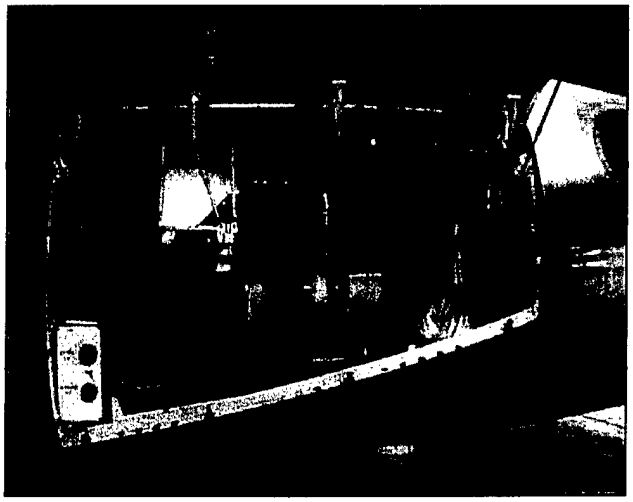


Figure 6. Fwd Main Landing Gear Pod: Larger outboard side access.

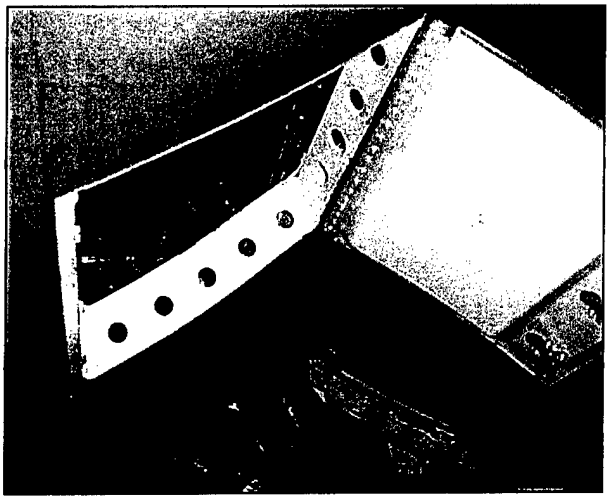


Figure 7. Fwd Main Landing Gear Pod: Inboard, bottom/side, access.

INNER DIMENSIONS

Height = 11.0'
Length = 6.0'
Depth = 6.0'

ENTRY DIMENSIONS

1. Side: Length = 7.0' Width = 3.5'
2. Side/Bottom: Length = 25.0" Width = 23.0"

(both entrances are rectangular)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each forward main landing gear pod has two entrances. The larger access panel is located on the side of the curved outboard part of the space; and the smaller access panel is located near the side/bottom of the inboard curved portion of the space.

RECOMMENDED CLASSIFICATION

Not a confined space.

JUSTIFICATION FOR CLASSIFICATION

The forward main landing gear pods do not have a limited means of entry and egress due to the size of the side access panel (7.0' by 3.5'). Therefore, they are not confined spaces and not regulated IAW the AFOSH and OSHA confined space standards.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers may enter the forward main landing gear pods to perform scheduled and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following tasks may be performed during scheduled and routine maintenance:

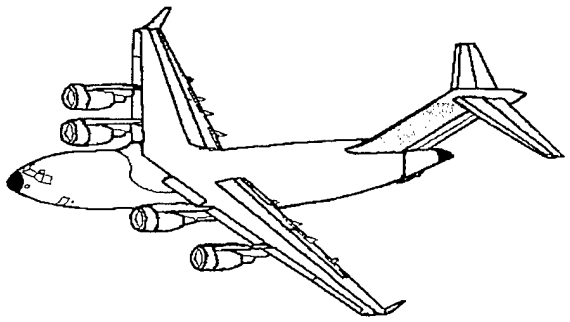
- Every three years, the hydraulic pump is repaired or replaced on each aircraft. The hydraulic pump has a 20-gallon hydraulic fluid tank that is not drained when the pump is replaced. The hydraulic fluid is captured in the system during the repair, which takes approximately one hour. Prior to starting work in the space, the hydraulic lines are depressurized. In addition, the circuit breakers are locked with safety collars, and tagged with danger-tags to prevent accidental ignition of the hydraulic system. Hydraulic fluid may be used in the space to top-off the fluid level. No additional chemicals are used during this task. During entry, personnel wear disposable nitrile or neoprene gloves, goggles or safety glasses, and approved footwear. Repairing and replacing the hydraulic pump is performed under TO *1C-17A-4-32*.

- APU inspections are performed every 120 days on each aircraft. The visual inspection takes a few minutes. If the APU needs to be repaired or replaced, this process takes approximately four hours. Before work is performed, hydraulic lines are depressurized; and lockout/tagout procedures are conducted on appropriate circuit breakers. On occasion, sealants may be used when the APU is reinstalled. Approximately one 5-ounce tube is used every three years. During entry, personnel wear disposable nitrile or neoprene gloves, goggles or safety glasses, and approved footwear. Repairing and replacing the APU is performed under TO *1C-17A-4-49 Auxiliary Power Unit*.

- The ECS pack is a turbine that changes the flow and temperature of air in the aircraft. The ECS pack is replaced every three years on each aircraft. Removing, repairing, and reinstalling the ECS pack takes approximately four hours. Prior to work on the ECS pack, hydraulic lines are depressurized and lockout/tagout procedures are performed on the appropriate circuit breakers. Sealants may be used when the system is replaced. Approximately one 5-ounce tube is used every three years. During entry, personnel wear disposable nitrile or neoprene gloves, goggles or safety glasses, and approved footwear.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the forward landing gear pods.

C-17 GLOBEMASTER III



VERTICAL STABILIZER (T-TAIL)

SPACE DESCRIPTION

The vertical stabilizer controls the rudder (left/right) motion of the aircraft. The space is located in the vertical tail section, and can be accessed by maintenance personnel. The vertical stabilizer contains flight control components such as elevator and rudder cables, pitch trim actuators (PTAs), and a massive jack-screw.

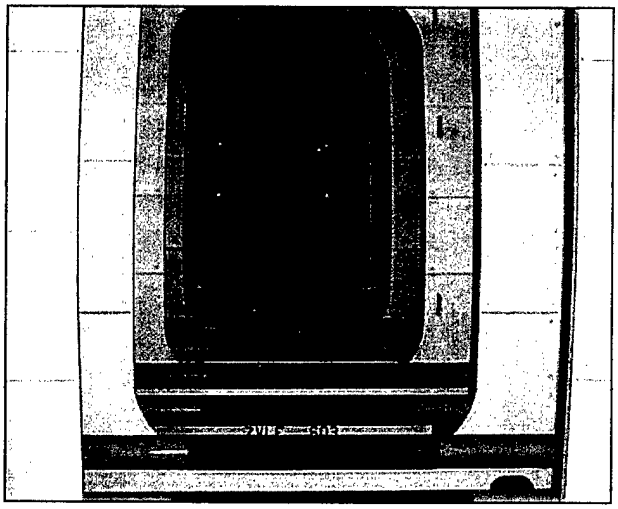


Figure 8. Vertical Stabilizer: Interior stairs (looking upward).

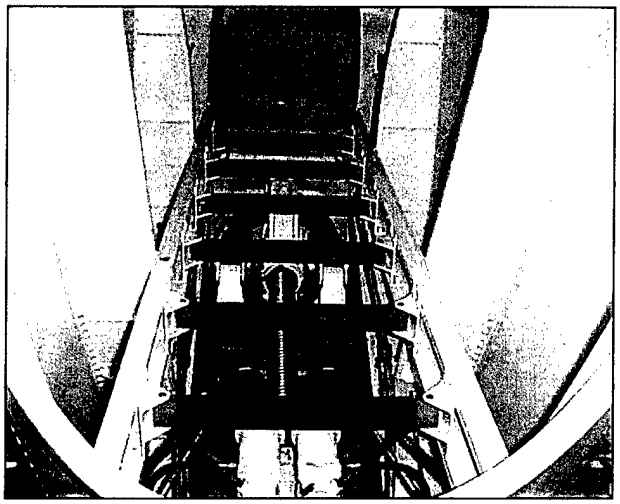


Figure 9. Vertical Stabilizer: Interior, Jack-screw near the top

INNER DIMENSIONS

Height = 3.0'
Length = 2.0'
Depth = 40.0'

ENTRY DIMENSIONS

1. Top: Length = 2.0' Width = 2.0'
2. Bottom: Length = 2.0' Width = 2.0'

(both entrances are square)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The vertical stabilizer is similar to a crawlspace that is elevated to about a 75-degree angle with an access at each end. The bottom entrance is accessed through the aft end of the fuselage. The top entrance is connected to the horizontal stabilizer, and is accessed from the top of the space (from within the horizontal stabilizer). There are 12 bulkhead-like compartments dividing the vertical stabilizer. Each bulkhead has semi-oval upper and lower entrances that are each 31" by 21".

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., elevator/rudder cables, PTAs, jack-screw) that are not CREDIBLE potential hazards, and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the vertical stabilizer to perform both scheduled and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following tasks may be performed during scheduled and routine maintenance:

- The actuators and hinge points are lubricated/greased three times every two years for each aircraft. The entire process takes four to five hours. The actuators and hinge points are located behind the rudder panels. The only chemical brought into the space is GP-395-General Purpose Aircraft Grease. Prior to entering the vertical stabilizer, rudder locks are placed around the rudder pedal; and danger tags (four hydraulic and two rudder detector system) are attached to the electric flight control system (EFC) switches. These two methods prevent accidental movement of the rudder during entry. This task is performed

under TOs *1C-17A-3-5* and *1C-17A-6WC-4-LUBE VERT, STAB, AREA, HORIZ/STAB, STRUTS.*

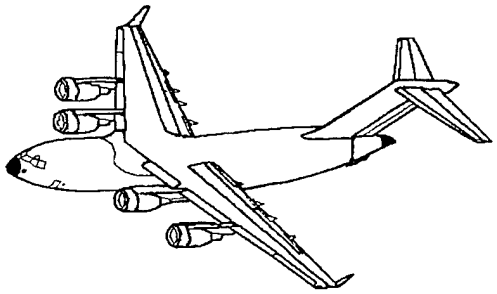
- Elevator and rudder cable inspections are conducted once a year for each aircraft. The elevator and rudder cables are located behind the ruder panels. Lubing and inspecting the condition of the cables takes four to five hours. A corrosive preventive compound (MIL-C-16173e) and GP-395-General Purpose Aircraft Grease are used to grease/lubricate the elevator and rudder cables. Prior to entering the vertical stabilizer, rudder locks are placed around the rudder pedal; and danger tags (four hydraulic and two rudder detector system) are attached to the EFC switches. These two methods prevent accidental movement of the rudder during entry. The elevator and rudder cable inspections are performed IAW TOs *1C-17A-3-5* and *1C-17A-6WC-2, DECK C-1.*

- PTA inspections are performed three times a year per aircraft. During the inspection, the jack-tube and points are lubed with GP-395-General Purpose Aircraft Grease. In addition, hydraulic fluid levels are topped-off. The entire inspection takes approximately 30 minutes. Prior to entering the vertical stabilizer, rudder locks are placed around the rudder pedal; and danger tags (four hydraulic and two rudder detector system) are attached to the EFC switches. These two methods prevent accidental movement of the rudder during entry. The PTA inspection are performed IAW TOs *1C-17A-3-5* and *1C-17A-6WC-B2 Deck.*

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the vertical stabilizer.

C-17 GLOBEMASTER III

HORIZONTAL STABILIZER



SPACE DESCRIPTION

The horizontal stabilizer controls the pitch (up/down) motion of the aircraft. The space is located in the horizontal tail section, and can be accessed by maintenance personnel. The horizontal stabilizer contains flight control components such as elevator and actuator cables.

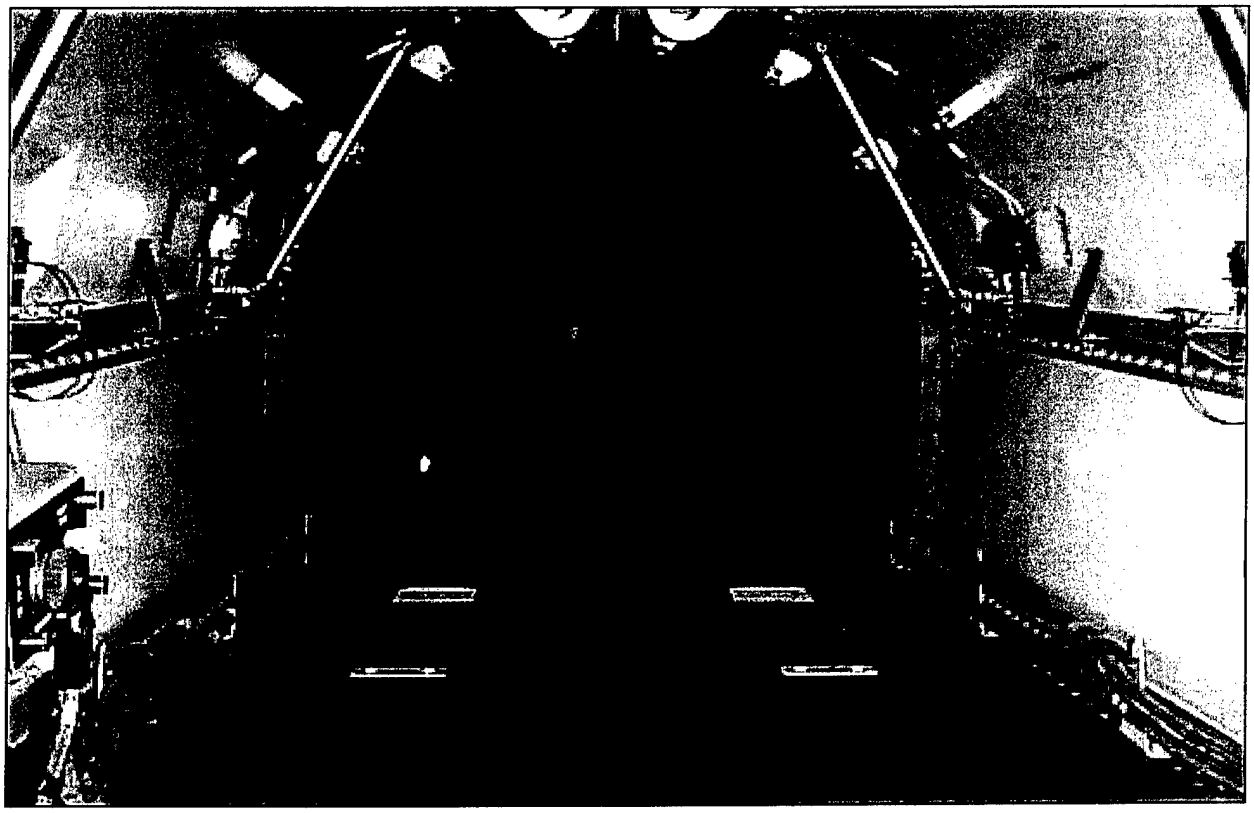


Figure 10. Horizontal Stabilizer: Interior crawlspace area facing the tapered aft end.

INNER DIMENSIONS

1. Crawlspace Area:	Length = 14.0'	Width = 3.0'	Depth = 28.0"
2. Tapered Aft Area:	Length = 13.0'	Width = 3.0'	Depth = 4.0'

ENTRY DIMENSIONS

1. Main Bottom Access:	Length =	3.0'	Width =	2.0'
2. Upper Outside Panel (left):	Length =	46.0"	Width =	21.0"
3. Upper Outside Panel (right):	Length =	46.0"	Width =	21.0"

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The main entrance of the horizontal stabilizer is semi-circular, and is located at the bottom of the space where the horizontal and vertical stabilizers join. Entry through the main entrance requires access from the vertical stabilizer. The main entrance leads into the crawlspace area of the horizontal stabilizer. The crawlspace area leads to the tapered aft section that contains two access panels leading to the exterior of the aircraft. These panels are located on the top of the horizontal stabilizer and can only be unlocked and opened from inside the space.

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., flight control components) that are not CREDIBLE potential hazards, and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the horizontal stabilizer to perform both scheduled and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following tasks may be performed during scheduled and routine maintenance:

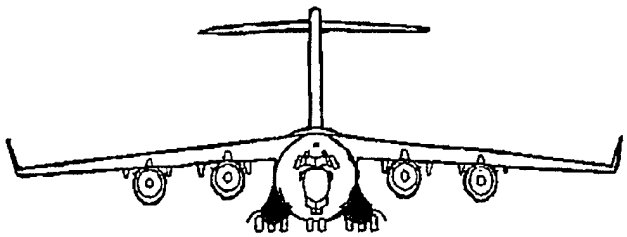
- The actuators and hinge points are lubricated three times every two years for each aircraft. The entire process takes approximately six hours. The actuators and hinge points are located behind the elevator panels that run along the aft end of the horizontal tail section. A battery-operated drill is used to remove the elevator panel screws. The only chemicals brought into the space are GP-395-General Purpose Aircraft Grease and a corrosive preventive compound (MIL C16173e). Prior to entry, elevator locks are placed around the yoke; and danger tags (four hydraulic and two rudder detector system) are attached to the EFC switches. These two methods prevent accidental movement of the rudder during entry. This task is performed under TO *1C-17A-6WC-2.*

- Elevator cable inspections are conducted once a year on each aircraft. The entire process takes approximately six hours. The elevator cables are located behind the elevator panels. After the elevator panels are removed using a battery-operated drill, the elevator cables are examined and lubed. A corrosive preventive compound (MIL C16173e) and GP-395-General Purpose Aircraft Grease are used to grease/lubricate the elevator cables. Danger tags (four hydraulic and two rudder detector system) are used to prevent accidental rudder movement during entry. The elevator cable inspection is performed IAW TO *1C-17A-6WC-2.*

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the horizontal stabilizer.

C-17 GLOBEMASTER III

AFT WHEEL WELL AREA – UPLOCK ASSEMBLY AREA



SPACE DESCRIPTION

There is an aft wheel well area located on each side of the aircraft. The uplock assembly section is located above the wheel well area. Both components are collectively classified as a single wheel well space. The space contains the landing gear, wheel and tire assembly, hydraulic brake system, electrical lines, hydraulic/nitrogen struts, and gear assembly.

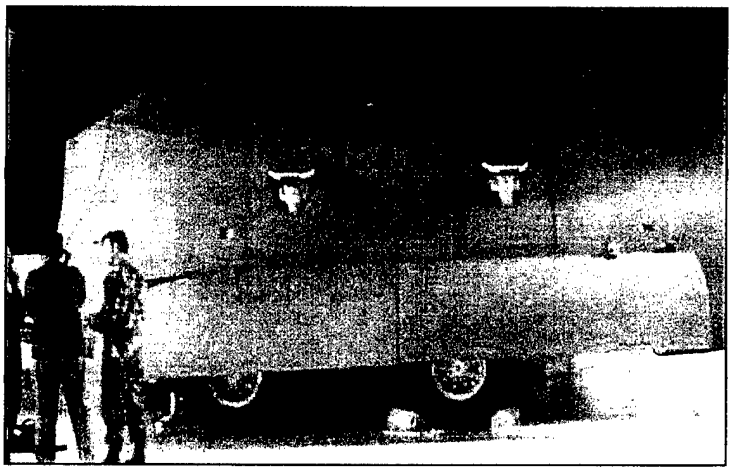


Figure 11. Aft Wheel Well Area: Exterior (outboard side).

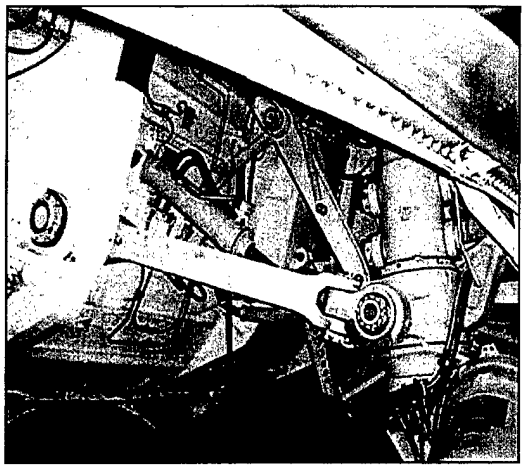


Figure 12. Aft Wheel Well Area: Interior.

INNER DIMENSIONS

Height = 21.0'
Length = 7.0'
Depth = 9.0'

ENTRY DIMENSIONS

1. Length = 21.0' Width = 5.0'
2. Length = 21.0' Width = 5.0'
(both entrances are rectangular)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each wheel well area has two entrances that are located at the bottom of the space.

RECOMMENDED CLASSIFICATION

Not a confined space.

JUSTIFICATION FOR CLASSIFICATION

The wheel well area does not have a limited means of entry and egress due to the size of the bottom entrances. Therefore, it is not a confined space and not regulated IAW the AFOSH and OSHA confined space standards.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers may enter the space to perform both scheduled and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following tasks may be performed during scheduled and routine maintenance:

- Scheduled maintenance inspections are conducted on each wheel and tire assembly every 120 days, or as needed depending on the number of landings. The bearings are greased/lubed, and nitrogen is added to the tires. Both tasks take a few minutes. Approximately once a month, both sets of rear tires (six tires) and the two nose area tires are replaced. Lockout/tagout procedures are conducted from within the cockpit by deactivating/tagging the hydraulic brake system, and removing/tagging various electrical circuit breakers. The only chemicals used during each inspection are nitrogen gas and approximately one pint of grease/lubricant. During entry, personnel wear goggles or safety glasses, approved footwear, and hearing protection. These tasks are performed IAW TOs *1C-17A-2-32JG-40-1* through *1C-17A-2-32JG-40-6*.

- Routine brake inspections and maintenance are performed every 120 days. During the inspection, the brakes are removed, reconditioned, replaced, and then the system undergoes an operational check. Reconditioning the brakes is conducted in the Brake shop or in the Non-Destructive Inspection (NDI) shop. The removal, replacement, and system check takes approximately two hours, and is conducted in the space. Prior to entry, the hydraulic brake system is deactivated and tagged from the cockpit. The only chemicals used during each inspection are hydraulic fluid and approximately one pint of grease/lubricant. During entry, personnel wear disposable nitrile or neoprene gloves, goggles or safety glasses, approved footwear, and hearing protection. The brake

inspections are performed under TOs *1C-17A-2-32JG-40-1* through *1C-17A-2-32JG-40-6*.

- The landing gear is replaced once every three years for each aircraft. The entire process take a total of 24 hours. After the landing gear is reinstalled, two 14-ounce cartridges of graphite-type lubricant are used to relube the various components. Lockout/tagout procedures are conducted from within the cockpit by deactivating/tagging the hydraulic brake system, and removing/tagging electrical circuit breakers. Personnel wear disposable nitrile or neoprene gloves, goggles or safety glasses, approved footwear, and hearing protection. The following are TOs that pertain to the landing gear: *1C-17A-2-32JG-00-1-Landing Gear General* and *1C-17A-2-32JG-40-1* through *1C-17A-2-32JG-40-6*.

- Lubing the gear assembly is conducted every 120 days for each aircraft. Approximately eight 14-ounce cartridges of graphite-type lubricant are used to lube 116 points in each of the two aft wheel well areas, and 70 to 80 fitting points in the front wheel well. Lubing every point takes approximately four hours. Lockout/tagout procedures are conducted from within the cockpit by deactivating/tagging the hydraulic brake system, and removing/tagging electrical circuit breakers. Personnel wear disposable nitrile or neoprene gloves, goggles or safety glasses, approved footwear, and hearing protection.

- Replacing and repacking a hydraulic/nitrogen pressurized strut occurs once every 18 months or if a leak is detected. The entire process takes approximately 12 hours per strut. Lockout/tagout procedures are conducted from within the cockpit by deactivating/tagging the hydraulic brake system, and removing/tagging electrical circuit breakers. Personnel wear disposable nitrile or neoprene gloves, goggles or safety glasses, approved footwear, and hearing protection.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the wheel well area.

C-17 GLOBEMASTER III

RAM AIR TURBINE (RAT) COMPARTMENT

Not Shown
(Located Underneath Aircraft)

SPACE DESCRIPTION

The ram air turbine (RAT) compartment is located underneath the C-17 aircraft, directly adjacent to the wheel well area. This space contains turbine fan and motor components (e.g., fan blade, hydraulic pump/lines, hydraulic fuse unit, deployment actuator). The RAT provides hydraulic and generator power in case of an in-flight emergency.

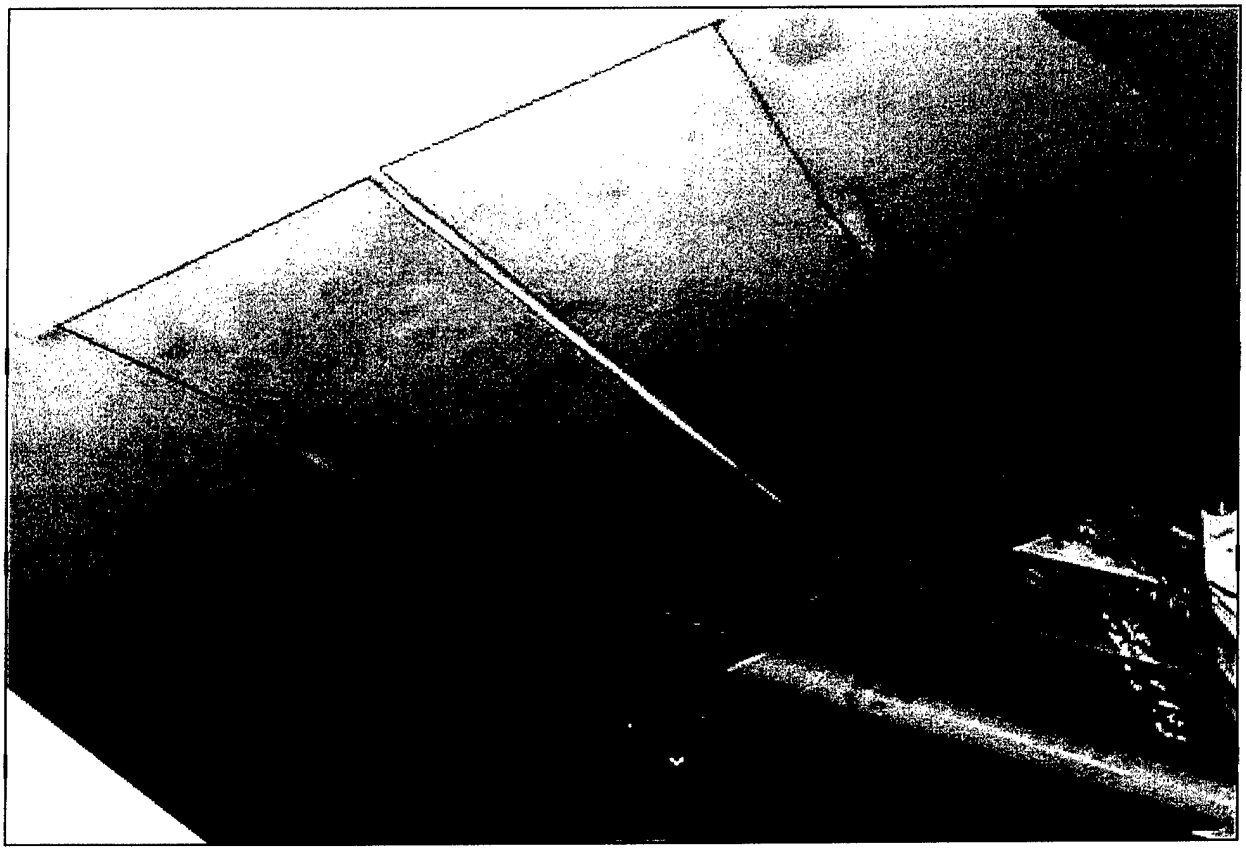


Figure 13. Ram Air Turbine (RAM) Compartment: Bottom access near aft wheel well.

INNER DIMENSIONS

Height = NA
Length = NA
Depth = NA

ENTRY DIMENSIONS

1. Length = 5.0" Width = 39.0"
2. Length = 5.0" Width = 39.0"
(both entrances are rectangular)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The RAT compartment has two identical bottom entrances located on the underbelly of the aircraft. The inner dimensions are unknown due to inability to open either access.

RECOMMENDED CLASSIFICATION

Not a confined space.

JUSTIFICATION FOR CLASSIFICATION

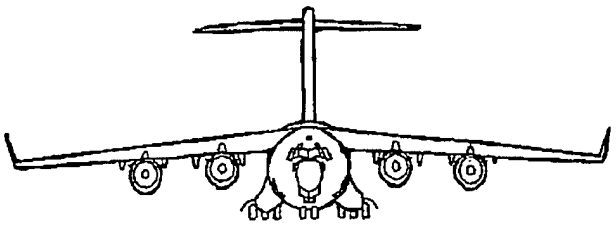
The RAT compartment cannot be bodily entered due to the size of the entrances. Therefore, it is not a confined space and not regulated IAW the AFOSH and OSHA confined space standards.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers perform scheduled and emergency maintenance activities on the turbine engine component. These tasks may involve inspecting, servicing, and replacing the turbine engine.

C-17 GLOBEMASTER III

WING ROOT AREA (FUSELAGE & WING AREA)



SPACE DESCRIPTION

The wing root area is the hollow space between the fuselage and wing of the aircraft. This area contains a variety of cables and lines.

SPACE ACCESS/INNER AREA

The wing root area does not contain any entrances. Panels from the body of the aircraft must be removed in order to enter the space. The inner dimensions are unknown due to inability to view the inside.

RECOMMENDED CLASSIFICATION

Not a confined space.

JUSTIFICATION FOR CLASSIFICATION

Since the wing root area does not have an actual entrance and the space is not large enough to be bodily entered, it is not a confined space and not regulated IAW the AFOSH and OSHA confined space standards. Shop personnel state that the triangular inner area is not large enough to enter completely.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers perform scheduled and emergency maintenance activities on the various cables/lines and on the panels/framework of the wing root areas.